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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

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In the Matter of	
Federal-State Joint Board on Universal Service	CC Docket No. 96-45
Forward-Looking Mechanism for High Cost Support for Non-Rural LECs	CC Docket No. 97-160

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REPLY COMMENTS OF AT&T CORP. AND MCI WORLDCOM, INC.

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TABLE OF CONTENTS

SUMMARY iii

INTRODUCTION 1

ARGUMENT 3

I. NATIONWIDE INPUT VALUES 3

II. DETERMINING CUSTOMER LOCATIONS 7

- A. Geocode Data 7
- B. Road Surrogate Customer Locations 10
- C. Methodology For Estimating The Number Of Customer Locations 11

III. OUTSIDE PLANT INPUT VALUES 11

- A. Copper And Fiber Cable Engineering Assumptions And Optimizing Routines 11
  - 1. Optimization. 11
  - 2. T-1 Technology. 12
  - 3. Distance Calculations and Road Factor. 13
- B. Cost Of Copper Cable 13
  - 1. Underground, Buried, And Aerial Copper Cable. 13
  - 2. Splicing And Engineering Costs 17
- C. Cable Fill Factors 19
- D. Structure Costs 22
  - 1. Aerial, Underground, And Buried Structure. 22
  - 2. Distribution Plant Mix. 23
- E. Structure Sharing 25
- F. Digital Loop Carrier Costs 27
- G. Serving Area Interface Costs 28

IV. SWITCHING AND INTEROFFICE FACILITIES 31

A. Switch Upgrades 31

B. Digital Loop Carrier Adjustment 35

V. EXPENSES 37

VI. CAPITAL COSTS 39

A. Depreciation 39

B. Cost of Capital 41

VII. OTHER ISSUES 42

CONCLUSION 44

SUMMARY

The comments filed in this proceeding confirm that the vast majority of tentative conclusions reached in the Commission's *Further Notice* are correct. Implementation of these proposals will significantly advance the process of accurately estimating forward-looking universal service costs.

Part I of these reply comments addresses the Commission's appropriate use of nationwide input values in the synthesis model. Developing multiple sets of input values on a state-specific, study area-specific, or holding company-specific basis, as some incumbent LECs propose, is neither practicable nor necessary. In the few instances in which disaggregated inputs values have been shown to be necessary (*e.g.*, to account for line density), the Commission already has proposed to adopt them.

Part II addresses customer locations. The comments confirm that actual geocode data are the most accurate source of customer location information, and that the best course is for the Commission to use these data, wherever possible, to identify customer locations. The comments likewise confirm that the PNR road surrogate algorithm is a reasonable method for estimating where customers are located in the absence of actual geocode data, but that the results of the PNR road surrogating algorithm should be adjusted downward to produce more accurate outside plant estimates. In addition, no commenter offers any legitimate objection to PNR's use of households, as opposed to housing units, in estimating customer locations.

Part III addresses outside plant:

Copper and fiber cable engineering and optimizing. The majority of commenters agree with the Commission that the synthesis model should be run with full optimization, that the T-1 option should not be used in the current version of the synthesis model, that

the model should use rectilinear distance in calculating outside plant distances, and that the road factor should be set equal to 1.0.

Copper cable costs. There is a general consensus that the Commission should develop input costs for both 26-gauge and 24-gauge copper cable in all cable sizes for which these gauges are commercially available, that it should adopt the same costs for feeder and distribution cable, and that it should adopt separate input values for the cost of aerial, underground, and buried cable. Citing imperfections in the NRRI study and the underlying RUS data, however, incumbent LECs urge the Commission to abandon this objective measure of cable costs entirely in favor of the incumbents' self-reported and self-serving "company-specific" values. That is neither consistent with forward-looking costing principles nor necessary. The Commission and both entrants and incumbents have proposed substantially similar *material* costs and, as described in Exhibit A to AT&T's and MCI WorldCom's comments, the Commission can properly reflect placing, splicing, and engineering costs simply by following the methodology the Commission's Staff used to develop costs for indoor feeder distribution interfaces.

Cable fill. As AT&T and MCI WorldCom have explained, the fill factors adopted by the Commission are generally too low. The Commission should reject the incumbent LECs' claims, premised on a backward-looking costing approach, that these values should be even lower.

Structure costs. A few incumbent LECs complain about the Commission's proposed input values for structure costs. But the incumbents refute their own claims in ultimately conceding that most of the Commission's proposed values are consistent with the incumbent LECs' estimates of their own costs.

Distribution plant mix. The incumbent LECs argue that the proposed default values for distribution plant mix are improperly based on nationwide values, and instead should be based on company-specific values. Even ignoring the difficulties that would arise in verifying each input value under such an approach, the only plant mix data submitted by incumbent LECs confirm that the proposed values, if anything, overstate costs by including too much underground distribution plant.

Structure sharing. Incumbent LECs complain that the proposed structure sharing percentages assign too little structure cost to the incumbent LEC. These claims are squarely refuted by the comments of SBC, which concedes that the sharing assignments proposed by the Commission align with SBC's current *embedded* sharing costs under the current monopoly regime in which incentives to share are not as strong as those found in a competitive environment.

Digital loop carrier costs. The incumbent LECs offer no serious defense of the obviously excessive digital loop carrier ("DLC") costs tentatively proposed by the Commission. The Commission should reject these values – which are refuted by the very contract information on which the incumbent LECs purport to rely – and should adopt the forward-looking DLC values proposed by the HAI sponsors.

Serving area interface costs. AT&T and MCI WorldCom support the indoor serving area interface ("SAI") costs tentatively adopted by the Commission, and urge the Commission to reject the incumbent LECs' efforts to further inflate these already substantial costs.

Part IV addresses input values for switching and interoffice facilities:

Switch upgrades. Contrary to the incumbent LECs' claims, the proposed treatment of switch upgrade costs is fully consistent with forward-looking costing principles. "Technology upgrade" costs already are reflected in the model through forward-looking depreciation lives, and Bell Atlantic's suggestion that the model should assume that switch capacity is purchased largely through costly "add-on" equipment ignores both core forward-looking costing principles and Bell Atlantic's own practice.

Digital loop carrier adjustment. The incumbent LECs provide neither empirical nor theoretical support for their half-hearted assertions that the Commission need not include an offset to account for the indisputably lower costs of terminating lines on a digital switch via an integrated DLC.

Part V addresses expenses. Although the Commission's proposed expense methodology may not meet the standard of absolute perfection, the Commission's proposed input values are reasonable. Even if the Commission elects to modify its proposed methodology in some minor respects, it should not adopt expense values that differ significantly from those it has tentatively adopted.

Part VI addresses capital costs. The Commission properly rejected the incumbent LECs' baseless arguments against use of the Part 32 depreciation lives in its *Further Notice*, and the incumbent LECs provide no new evidence to demonstrate that these lives are not forward-looking. With respect to the cost of capital, GSA again demonstrates that it would be entirely inappropriate for the Commission to use the current federal rate of return of 11.25 percent – which grossly exceeds the true forward-looking cost of capital of approximately 8.64 percent – to calculate universal service costs.

Part VII shows that the Commission should aggregate a holding company's operations within a state for purposes of applying the criteria of 47 U.S.C. § 153(37). No commenter has rebutted AT&T's and MCI WorldCom's showing that efficiencies are reaped on the holding company level, or that treating study areas separately would allow a holding company to devise corporate structures that manipulate the universal service system to the detriment of competition and consumers.

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In the Matter of	)	
Federal-State Joint Board on Universal Service	)	CC Docket No. 96-45
Forward-Looking Mechanism for High Cost Support for Non-Rural LECs	)	CC Docket No. 97-160

REPLY COMMENTS OF AT&T CORP. AND MCI WORLDCOM, INC.

Pursuant to the Commission's *Further Notice*,[1] AT&T Corp. ("AT&T") and MCI WorldCom, Inc. ("MCI WorldCom") hereby submit their reply comments on the input values the Commission proposes to use in determining high cost support for non-rural carriers beginning January 1, 2000.

INTRODUCTION

Review of the July 23, 1999 comments filed in this proceeding confirms that the vast majority of tentative conclusions reached in the Commission's *Further Notice* are correct. Implementation of these proposals will significantly advance the process of accurately estimating forward-looking universal service costs.

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[1] Further Notice of Proposed Rulemaking, *Federal-State Joint Board on Universal Service, Forward-Looking Mechanism for High Cost Support for Non-Rural LECs*, CC Docket Nos. 96-45, 97-160, 1999 WL 343066 (F.C.C. rel. May 28, 1999) ("*Further Notice*"). Any citations to the July 23, 1999 comments contained herein are to the proprietary versions of those comments.

These reply comments focus on contrary arguments by incumbent local exchange carriers ("LECs"). Those arguments lack any consistent principles and do not reflect good faith attempts to estimate truly *forward-looking* universal service costs. For example, the incumbent LECs clamor that the Commission should reject PNR's geocoded data – which have been available to all interested parties and are, by their nature, easily verifiable – and in the same breath urge the Commission to use company-specific, non-public, unsubstantiated, and unverifiable embedded cost data for virtually all other inputs. Similarly, the incumbent LECs complain that the RUS cable cost data should be rejected precisely because they include large cost variances, but propose the use of "company-specific" data that allegedly reflect just such variances. As described below, the Commission should reject the incumbent LECs' unprincipled and results-driven efforts to cherry-pick input values, and should likewise reject the incumbent LECs' attempts to re-raise platform issues that are not properly presented in this input proceeding.[2] Instead, the Commission should abide by the vast majority of its conclusions, and should modify others in accordance with AT&T's and MCI WorldCom's comments and reply comments.

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[2] For example, GTE attempts to raise an argument concerning the "line limit" imposed on clusters. GTE at 45-46. This issue, however, is a platform issue, and thus is not properly raised here. In any event, GTE's argument is mistaken. Although some clusters do have line counts that exceed the 1800 design limit, such a result is inevitable because a single business location, standing alone, may have more than 1800 lines. Both the HAI and the synthesis model properly engineer such a business location as a single cluster served by multiple cables or digital loop carrier remote terminals as necessary to provision all of the required lines.

ARGUMENT

I. NATIONWIDE INPUT VALUES

In the *Further Notice* (¶ 21), the Commission "proposed using nationwide, rather than company-specific input values in the federal mechanism." AT&T and MCI WorldCom agree that nationwide values generally should be used. Developing separate input values on a state-specific, study area-specific, or holding company-specific basis, as some incumbent LECs propose, is neither practicable nor necessary. In addition, the incumbent LECs' proposals to deal with the obvious administrative feasibility problems involved in developing and using multiple sets of input values are flatly inconsistent with the Commission's forward-looking costing principles.[3]

For the most part, the incumbent LECs simply ignore the extreme practical difficulties associated with developing multiple sets of disaggregated input values. The Commission and the carriers have spent an enormous amount of time and resources just to develop a *single* set of nationwide input values to be used in the synthesis model. Developing *51 different sets* of state-specific input values for each of the more than 1300 input values used by the synthesis model would plainly be an extremely costly and time-consuming administrative nightmare.[4] These unnecessary burdens would be multiplied if the mandate was to develop different sets of input values for each of the 99 current company-specific non-rural study areas.

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[3] *See, e.g.*, Ameritech at 8; Bell Atlantic at 5-6, 18; BellSouth at 2-4; Cincinnati Bell at 2-5; GTE at 10-13, 72-74; U S West at 33; Sprint at 3-7; SBC at 4, 14-15. Some incumbent LECs have supported the use of nationwide values in some circumstances. *See, e.g.*, SBC at 11 ("SBC favors using nationwide input values for plant mix as opposed to the other proposed alternatives.")

[4] *See, e.g.*, Sprint at 6 (conceding that significant "additional time and resources . . . would undoubtedly [be] require[d]" to develop disaggregated input values).

The incumbent LECs' proposed solution to these practical realities is for the Commission to blindly adopt the self-reported – and unverifiable – company-specific values proposed by the incumbent LECs. The Commission, however, has properly avoided the use of such values because the underlying data typically are neither open to, nor verifiable by, the public, and, indeed, generally have not even been made available under protective order.[5] And, to the extent the underlying data have been made available, AT&T and MCI WorldCom have shown that there is virtually no relationship between the underlying data supplied by the incumbent LECs and the input values they claim to derive from that data. AT&T/MCI WorldCom at 15, 32-35 & Exhibits A & B.[6] Further, such values at best only reflect the idiosyncratic costs that an individual LEC *has* incurred while operating in a monopoly environment, not the forward-looking costs that an efficient carrier *would* incur in providing the services supported by the universal service fund.[7] As the Commission has noted, the use of nationwide values is "more consistent with the forward-looking nature of the high cost model because it mitigates the rewards to less efficient companies." *Further Notice*, ¶ 198; *see also* BellSouth at A-8 (conceding that "a single set of [nationwide] inputs might mitigate rewards to less efficient companies").

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[5] *See, e.g., Further Notice*, ¶ 203; *id.* ¶ 199 (seeking an expense "methodology that permits such distinctions without resorting to self-reported information from companies"). BellSouth claims its cost values are "verifiable." BellSouth at A-1. In fact, BellSouth has submitted no data that would allow these costs to be verified, and its proposed figures are based on nothing but BellSouth's unsubstantiated say-so.

[6] These proprietary data typically lack any background support in the form of invoices, workpapers, or methodological development descriptions.

[7] BellSouth claims that its self-reported cost values are forward-looking because BellSouth is faced with a "host of potential market entrants." BellSouth at 3. The reality, of course, is that given the near total lack of actual local competition in BellSouth's markets three years after the passage of the 1996 Act, there are no significant market forces requiring BellSouth to reduce its costs.

Indeed, the clear need to verify incumbent LEC-specific data merely underscores that nationwide input values are the only practicable solution. In Florida, for example, the state commission held that BellSouth had proposed inflated values for installed cable costs, and accepted Sprint's proposed values instead.[8] Thus, for each state (or study area or holding company), the Commission would have to decide whether to adopt the self-reported cost estimates that the incumbent LECs submit to the Commission, the alternative input values proposed by new entrants, the values the incumbent LECs may have submitted to their relevant state commissions, the values actually adopted by those state commissions, or the values developed through some other method, and would have to do so for *each* of hundreds of inputs.

Even if it were possible as a practical matter to engage in this exercise, the incumbent LECs have failed to show that the alleged benefits of disaggregated values justify the time and expense involved in developing them. It is one thing for the incumbent LECs to claim that, due to various factors (*e.g.*, weather differences), efficient carriers may incur higher or lower costs relative to the nationwide average for some input values, and quite another to conclude that these cost differences are so significant and so disproportionate in a single direction that the use of nationwide values would lead to an arbitrary and unreasonable universal service mechanism. In this regard, the Commission has repeatedly found that it has been unable to identify any significant differences between its proposed nationwide values and some of the disaggregated values it has explored.[9]

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[8] Order No. PSC-99-0068-FOF-TP at 159, Docket No. 980696-TP (Fla. PSC Jan. 7, 1999) ("We find that BellSouth's use of linear loading factors produces inherently (continued . . .)

Finally, in the few instances in which disaggregated inputs values have been shown to be necessary due to immutable cost-causative factors (*e.g.*, density), the Commission has tentatively proposed to adopt them. For example, most outside plant costs appear to vary more by density and terrain than by any other factors, and the synthesis model reflects these urban, suburban, rural, and terrain cost differences. *See, e.g., Further Notice*, ¶ 97 (tentatively adopting fill factors that vary by density zone); *id.* ¶ 119 (tentatively adopting plant mix percentage that vary by density zone); *id.* ¶ 129 (tentatively adopting structure sharing percentages that vary by density zone); *id.* ¶ 106 (tentatively adopting structure costs that vary by terrain conditions (water, soil, and rock)). The Commission also has tentatively adopted structure investment and expense costs that vary by structure type (aerial, buried, or underground) and loop segment (distribution or feeder), *id.*, and has tentatively adopted expenses that vary by the type of

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(continued . . .)
unreasonable results.")

[9] *See, e.g., Further Notice*, ¶ 199 ("we have been unable to verify significant regional differences among study areas or between companies based solely on labor rate variations"); *id.* ¶ 201 ("[w]e have found no significant differences in the expense factor per-line or per-investment estimates based on [number of access lines served]"); *id.* ¶ 215 ("administrative and service expenses are less dependent on carrier physical plant or geographic differentials than those that also correlate to company size (number of lines) and demand (minutes of use), which were used as estimation variables to develop the model inputs"); *id.* ¶ 216 ("[a]s with the plant-specific accounts, we could find no significant differences in the expense factor per-line based on [number of access lines serviced or total dial equipment minutes reported]").

plant installed, *id.* ¶ 199.[10] Thus, the synthesis model properly uses disaggregated values when cost differences are likely to be significant, and uses nationwide values when significant cost differences are unlikely.[11]

II. DETERMINING CUSTOMER LOCATIONS

A. Geocode Data

The comments confirm that there is no dispute that actual geocode data are the most accurate source of customer location information.[12] Nor is there any serious dispute that PNR's geocode data, even if not 100 percent comprehensive, are the best data available today.[13] In these circumstances, the appropriate course is for the Commission to use the PNR geocode data to identify customer locations wherever possible.

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[10] In addition, as Sprint (at 6) recognizes, the Commission has taken "significant steps" toward disaggregated values by "separat[ing] rural companies from non-rural companies with regard to an explicit, federal universal service mechanism."

[11] AT&T and MCI WorldCom believe that if it is necessary to reflect regional differences in labor costs, the appropriate way to do this is to use reliable sources of construction technician data, such as Means' Building Construction Cost Data or Kiley's National Construction Estimator to adjust a calculated nationwide labor rate.

Sprint, however, proposes that many input values should adjusted to reflect size differences between non-rural companies. *See, e.g.*, Sprint at 54-55. AT&T and MCI WorldCom disagree with this proposal. As discussed below, most of the cost differences Sprint ascribes to company size are driven not by size, but by efficiency. Furthermore, Sprint neglects to mention that, as a holding company, it owns Sprint North Supply. This large wholesale company purchases materials and supplies not only for Sprint's franchised telecommunications carriers, but also for resale to many other companies. Finally, if Sprint is indeed efficient, as it claims, *see, e.g.*, Sprint at 6, but nonetheless suffers from certain costs, then its "small" size must also allow it to enjoy certain countervailing economies that are unavailable to larger incumbent LECs.

[12] *See, e.g.*, Ameritech at 2 ("Ameritech has indicated in previous comments in this proceeding that the use of accurate geocode data is very important in order to develop reasonable and accurate loop costs in the platform model"). Bell Atlantic at 13 (conceding the Commission's theoretical reasons that geocode data is the most precise method of customer location information, though disputing the public availability of its sources); SBC at 5 (same); PRTC at 2-3 (citing widespread agreement that geocode data is the most accurate form of customer location data but expressing concern over its unavailability in Puerto Rico). Indeed, GTE recently filed geocoded data – prepared by PNR – to support its comments in the *UNE Remand Proceeding*. *See* GTE Comments at Appendix D, *Implementation of the Local Competition Provisions in the Telecommunications Act of 1996*, CC Docket No. 96-98 (filed May 26, 1999).

The incumbent LECs' suggestion that the Commission should, for now, abandon geocoding in favor of an inferior road surrogate data approach for all customer locations merely because the PNR data are incomplete or less than 100 percent perfect is a *non sequitur*. To be sure, the Commission should continue to make every effort to improve the accuracy and coverage of the universal service cost model geocode data set. As AT&T and MCI WorldCom have previously explained, the most direct way to do that is to require the incumbent LECs to make available their own customer location, line count and type, and wire center information that they claim is more comprehensive and accurate than the PNR data.[14] Unless and until better data that will increase the number of customer locations successfully geocoded are produced and verified, however, the PNR data, in their current form, will continue to provide the most comprehensive and accurate customer location estimates.

Recognizing as much, the incumbent LECs attempt to draw attention away from the clear superiority of the PNR approach by feigning difficulties in obtaining access to the PNR data. As AT&T and MCI WorldCom pointed out in their comments, PNR has gone to great lengths to make its data available for all interested parties seeking to verify its accuracy. AT&T/MCI WorldCom at 5-6.[15] PNR has invited all interested parties to review PNR geocode data and question PNR staff on location. PNR has provided access to the clustering routines and point data for all road surrogate data. The incumbent LECs have extensively reviewed the PNR data and approach in the context of state proceedings.[16] And, PNR has expressed its continued willingness to host Commission sponsored open house workshops to facilitate the greatest possible access to the geocode data consistent with the proprietary nature of the customer location data. The incumbent LECs have yet to reciprocate with *any* access to their own customer location information, even though such information could provide the additional verification for the PNR data that the incumbent LECs allegedly seek. In short, although AT&T and MCI WorldCom encourage the Commission to recognize and facilitate PNR's efforts to provide the highest degree of openness feasible, the PNR data are already among the most verifiable data in this proceeding and the incumbent LECs' fabricated "openness" concerns provide no conceivable basis for failing to use the most comprehensive and accurate customer location data available.[17]

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[13] *See, e.g.*, Ameritech at 2-3 (urging continued improvements in making PNR data available as it is the only source of non-proprietary geocode data); Sprint at 10 (taking issue with PNR's data availability, but proposing no alternative sources of geocode data).

[14] *See* U S West at v-vi ("The second step is to ask eligible telecommunications carriers (ETC) to provide geocoded service address data (latitude and longitude) for each customer they serve in these [low density] areas. If a company does not wish to receive support, it need not provide the customer location data.") *Cf.* Ameritech at 6-7 (claiming that Ameritech's internal data may be more accurate but admitting that it is proprietary and not available).

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[15] *See, e.g.*, PNR response to Thomas Mitchell of GTE (Apr. 29, 1999 (filed with the Commission on Apr. 4, 1999)).

[16] *See* AT&T/MCI WorldCom at 5.

[17] GTE's contention (at 36) that "the Model must not use PNR geocoded data because PNR has refused to make its data available for review" is particularly indefensible. Not only is this allegation false, it is flatly at odds with GTE's decision to advocate the use of proprietary PNR geocode analyses in its comments in the *UNE Remand Proceeding*. *See* GTE Comments at 32, *Implementation of the Local Competition Provisions in the Telecommunications Act of 1996*, CC Docket No. 96-98 (filed May 26, 1999) ("GTE (continued . . .)

B. Road Surrogate Customer Locations

AT&T and MCI WorldCom agree with Ameritech that "the PNR road surrogate algorithm is a reasonable method for locating customers in the absence of actual geocoded data."[18] The comments likewise confirm that there is an upward bias in road surrogate estimations of required plant when compared to calculations based upon actual geocode data, particularly in rural areas.[19] For that reason, as AT&T and MCI WorldCom explained in their comments, results of the PNR road surrogating algorithm should be adjusted downward to produce more accurate outside plant estimates.[20]

(continued . . .)
commissioned PNR & Associates – a consulting firm with extensive information on the deployment of CLEC facilities *and the location and number of CLEC customers.*") (emphasis added); *see also id.* at App. D, p. 5 ("The root analysis is based on PNR's proprietary CLAIMS™ process for identifying and quantifying bypass."); *id.* at App. D, p. 8 ("PNR's CLAIMS™ process is based on an internal and proprietary process that links site specific information with service provider information. The site specific information includes real estate files, reverse directories, public files and business and residential files maintained by other companies. All data used in CLAIMS™ is consistently geo-coded and combined into a single location database. This database is the input for PNR's process for constructing a database of geo-coded buildings.").

[18] Ameritech at 3; *see also* Sprint at 12 (expressing support for a surrogate method like PNR's which locates customers along roads).

[19] *See* AT&T and MCI WorldCom at 3-4; *see also* Ameritech at 3-6 (offering a potential explanation for the upward bias of PNR road surrogate data); SBC at 5 (noting inflation of road surrogate data over actual geocode data).

[20] The methodology that AT&T and MCI WorldCom used to establish the amount of upward cost bias that results from using all road surrogate data is provided in Exhibit A to these reply comments. When final data are available, these estimates can be updated. Other commenters offer different, and somewhat puzzling, views on the issue of overestimation. Sprint claims that failure to consider topography leads to an underestimation of plant, but ignores that the model compensates for such geographic differences in other ways. Sprint at 12-13. GTE asserts that no conclusions can be drawn concerning whether road surrogating overestimates outside plant, then offers a "possible" reason for why it may be understated. GTE at 39. Exhibit A (to these reply comments) contains an estimate, by study area, of the potential overestimation of monthly cost due to
(continued . . .)

C. Methodology For Estimating The Number Of Customer Locations

No commenter offers any legitimate criticism of the Commission's conclusion that PNR's methodology for estimating the number of customer locations appropriately counts households, as opposed to housing units, in its calculations. PNR's approach already produces an estimate of the number of residential locations requiring service that is greater than the number that currently receive service, thus compensating for temporarily vacant units. AT&T/MCI WorldCom at 8. Further, the fill factors advocated by AT&T and MCI WorldCom provide more than enough excess plant to efficiently account for churn and other uncertainties.

On the issue of estimating wire center boundaries, AT&T and MCI WorldCom continue to support BLR wire center information as the only currently available source of such data. SBC claims to have wire center boundary information available electronically. SBC at 6. As AT&T and MCI WorldCom indicated in their comments, they welcome production by incumbent LECs of wire center information which, once verified, could be used to supplement PNR data. AT&T/MCI WorldCom at 8-9.

III. OUTSIDE PLANT INPUT VALUES

A. Copper And Fiber Cable Engineering Assumptions And Optimizing Routines

1. Optimization.

As AT&T and MCI WorldCom explained in their comments, the Commission's tentative conclusion that the synthesis model should be run with the optimization turned

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(continued . . .)
the inclusion of surrogate points in the PNR input data.

on is unquestionably correct. AT&T/MCI WorldCom at 9-10. The majority of carriers that addressed this issue agree that the synthesis model should be run with full optimization,[21] and even GTE, an opponent of optimization, agrees that shorter run times do not provide a valid justification for deviating from full optimization. GTE at 33.[22]

2. T-1 Technology.

The commenters (including AT&T and MCI WorldCom) that addressed the Commission's tentative conclusion that it should not use the T-1 option in the current version of the synthesis model generally support that conclusion. *See, e.g.*, GTE at 62; SBC at 7. On a going-forward basis, however, the Commission should modify the synthesis model to use T-1 technology in the same manner as does the HAI model – *i.e.*, as a *distribution* alternative to serve outlying customer locations beyond 18,000 feet from a main cluster's center. AT&T/MCI WorldCom at 11. Nothing in the incumbent LECs' comments undermines AT&T's and MCI WorldCom's showing with respect to this issue.

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[21] *See, e.g.*, U S West at 21; SBC at 7; Sprint at 16. U S West supports the use of the optimization algorithm, but does not agree that the Commission should select the lesser of the costs calculated by the "rule of thumb" approach and the optimization approach. U S West at 21. U S West's "turkey dinner" analogy is inapposite, however, because the rule of thumb methodology is *not* an averaging methodology that assigns the same value to each density zone, as in U S West's analogy. U S West at 20. Instead, it is a methodology that assigns an individual value to each density zone in the same manner as does the optimization algorithm, and thus provides an independent calculation of sufficient outside plant for those density zones. In addition, because the optimization routine is Prim, and not Steiner, it is possible that the "rule of thumb" can legitimately provide a feasible, lower cost result than the optimization routine in certain cases. SBC agrees that the optimization routine "appear[s] to offer the most cost effective design," but "recommends a comparison of the Commission's results with and without optimization." SBC at 7. As shown in AT&T's and MCI WorldCom's comments, such a comparison reveals that the Commission properly concluded that the model should be run with optimization turned on. AT&T/MCI WorldCom at 10.

[22] AT&T and MCI WorldCom also showed that if an intermediate value is to be chosen, it should be set at least as high as –p850 to ensure sufficiently accurate results. AT&T/MCI WorldCom at 10. No other commenter directly addressed this issue.

3. Distance Calculations and Road Factor.

In their comments, AT&T and MCI WorldCom supported the Commission's tentative conclusion that the synthesis model should use rectilinear distance, rather than airline distance, in calculating outside plant distances, and that the road factor should be set equal to 1.0. AT&T/MCI WorldCom at 12-13. The only other carriers to address this issue agree, *see* GTE at 35; SBC at 7, and the Commission should accordingly adopt its tentative conclusions.

B. Cost Of Copper Cable

1. Underground, Buried, And Aerial Copper Cable.

There is a general consensus that the Commission should use 26-gauge and 24-gauge copper cable in all available cable sizes, that it should adopt the same costs for feeder and distribution cable, and that it should adopt separate input values for the cost of aerial, underground, and buried cable.[23] Incumbent LECs and others, however, question the Commission's tentative decision to use the estimates in the Gabel/Kennedy NRRI study, as modified by the Huber "robust regression" methodology, to determine the costs of this cable.[24]

The Gabel/Kennedy NRRI study, even as currently adjusted, is not perfect. For example, AT&T, MCI WorldCom, and Ameritech have demonstrated that the Staff's methodology improperly produces a negative cost per foot for underground cable in larger cable pair sizes. *See* AT&T/MCI WorldCom at 13-14 & Exhibit A; Ameritech at 10-11. Similarly, AT&T, MCI WorldCom, and several incumbent LECs have shown that the rural LEC data as collected by RUS and used in the NRRI study, even as currently modified, do not always accurately reflect the costs that will be incurred by non-rural LECs.[25]

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[23] *See, e.g.*, AT&T/MCI WorldCom at 13; GTE at 47-48; Sprint at 17-18; SBC at 7-8.

[24] *See, e.g.*, AT&T/MCI WorldCom at 13-14; Ameritech at 9-18; GTE at 13-31; Sprint at 18-21; Bell Atlantic at 15-18.

The proper solution, however, is not, as some incumbent LECs propose, to abandon the Commission's proposed methodology in its entirety and adopt copper cable input values based on the incumbent LECs' self-reported "company-specific" values.[26] Rather, the proper solution is to correct the Commission's proposed methodology only where necessary. First, there is no basis for completely rejecting the Commission's methodology with respect to copper cable *material* costs. As shown in Exhibit A to AT&T's and MCI WorldCom's comments, despite the criticism the incumbent LECs have leveled at the RUS data and the Commission's methodology, the HAI sponsors, the Commission, and most of the incumbent LECs have proposed substantially similar values with respect to copper cable material costs. Thus, the Commission can (and should) determine copper cable material costs using all available data (including RUS data) for which material costs can be disaggregated from labor costs.

Second, there is no basis for concluding that the incumbent LECs' self-reported and self-serving company-specific input values for the loaded costs of placed copper cables are any more reliable than the input values tentatively adopted by the Commission. Given the similarities in the parties' proposed cable material costs, loaded costs of placed copper cables are only reliable if the methodologies use to establish the loading factors are reasonable. As shown in AT&T's and MCI WorldCom's comments (at 15), the copper cable input values submitted by the incumbent LECs are *less* reasonable than the values generated by the Commission's proposed methodology because the incumbent LECs have proposed inflated costs by using improper "In-Plant [Loading] Factors," "Loop Installation Factors," and other similar devices that produce patently excessive results. *Id.* at 15 & Exhibit A.[27] In *no* case was it possible to verify the claimed link between the incumbent LECs' underlying data and their proposed costs, and no incumbent LEC provided any backup information to explain its loading costs. And, as described above, the extensive verification that would be necessary renders any company-specific input value approach impracticable.

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[25] AT&T/MCI WorldCom at 14; *see, e.g.*, GTE at 13-31; Sprint at 18-21. Contrary to the incumbent LECs' assertions, most of the defects in the NRRI study systematically *inflate* (not deflate) the model's results.

[26] *See, e.g.*, Sprint at 20; Bell Atlantic at 18; Ameritech at 7-9; GTE at 10-13.

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[27] In Alabama, AT&T's witness demonstrated that BellSouth's use of in-plant factors led to absurd results:

> Q. HAVE YOU PERFORMED QUANTITATIVE REASONABLENESS TESTS ON BELLSOUTH'S CABLE PLACING COSTS?
>
> A. Yes. I performed a simple reasonableness test. BATES Page 000230 shows Fiber Costs – Underground. The "Placing" costs for one foot of 288 fiber cable is shown as $5.40. In response to AT&T's Data Request, Item No. 5, BellSouth responded under Item No. 5a, Attachment No. 1, Page 1 of 1, with a Regional Labor Rate of $40.80. A quick calculation of 8 hrs./day x $40.80/hr. divided by $5.40/ft. reveals that this cost equates to only 60 feet of fiber cable placed per workday. I have been personally involved in placing fiber cable 35,000 feet long without a splice. Since there are hundreds of feet between manholes in BCPM, it would take two workweeks to even run fiber cable between two manholes. This is typical of the over-costed default values in BCPM.

Rebuttal testimony of Mr. John C. Donovan before the Alabama Public Service Commission, *Implementation of Universal Service Requirements of Section 254 of the Telecommunications Act of 1996*, Docket No. 25980 (Feb. 26, 1998).

The Commission is not required to develop a perfect cost model, only a reasonably accurate one. And, unlike the incumbent LECs who are content to criticize the flaws in the Commission's methodology while offering nothing but "trust me" numbers in return, AT&T and MCI WorldCom have proposed a reasonable methodology that can be used to address the most significant defects in the Commission's proposed approach. *See* AT&T/MCI WorldCom at Exhibit A. Specifically, AT&T and MCI WorldCom have proposed that the Commission adopt a methodology similar to that used by the Commission's Staff in determining appropriate indoor feeder distribution interface ("FDI") costs. No party had a valid objection to that methodology in this proceeding.

AT&T's and MCI WorldCom's proposed approach begins with the recognition that the HAI sponsors and most of the incumbent LECs have proposed substantially similar values with respect to copper cable *material* costs. *Id.* Thus, all the Commission need do is adopt reasonable values for the costs of cable placing, splicing, and engineering based on the expert opinions submitted in this proceeding, and add those values to the material costs. *Id.* This approach allows the Commission to avoid the defects caused by the RUS data and the incumbent LECs self-serving and unsupported input values, and thus permits the Commission to determine a reasonable set of forward-looking copper cable costs.[28]

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[28] BellSouth improperly claims that the Commission's tentatively proposed values fail to account for exempt costs. BellSouth has failed to review the specifications involved in RUS projects that are readily available in the public domain. Specifically, REA Bulletins 345-150, 345-152, and 345-153, titled, *Specifications and Drawings for Construction of*
(continued . . .)

2. Splicing And Engineering Costs

As described above, Exhibit A to AT&T's and MCI WorldCom's comments proposes that the Commission add splicing and engineering costs to cable material costs using a step-by-step approach similar to that used by the Commission's staff to calculate FDI costs.[29] AT&T and MCI WorldCom also proposed reasonable values for the costs of splicing and engineering, and urge the Commission to adopt these proposed values.

In no event should the Commission adopt the splicing and engineering values proposed by BellSouth or Sprint. *See* BellSouth at B-8 to 9; Sprint at 23-28. With respect to splicing, BellSouth does not and cannot provide any explanation as to why aerial and underground cable splicing should cost two thirds more than buried splicing. Furthermore, BellSouth's proposed values are demonstrably absurd. Assuming a worst-case-scenario in which underground splices are needed at each manhole spaced 400 feet apart, a splice setup and closure time interval of 2 hours (from the Staff's FDI study), a fully loaded labor rate of $60 per hour (from the Staff's FDI study), and a 2400 pair 24-gauge cable material cost of $12.77 (from BellSouth's own values for Florida),

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Direct Buried Plant, for Underground Cable Installation, and *for Pole Lines and Aerial Cables*, respectively. These specifications, as well as others in that series, indicate that exempt materials and supplies are included in the work requirements associated with the RUS contracts, such as those utilized in the NRRI study.

[29] In AT&T's and MCI WorldCom's proposed approach, engineering, splicing, and placement costs are not based on percentages of material investment. Such percentages are inappropriate because it is no more expensive to engineer, splice, or place a more expensive 24-gauge cable than it is to engineer a less expensive 26-gauge cable. AT&T/MCI WorldCom at Exhibit A. GTE (at 49-50) and Sprint (at 24-25, 27) agree that the application of these percentage can lead to illogical results. Sprint (at 24-25) implicitly supports using AT&T's and MCI WorldCom's granular approach by advocating per foot values for engineering and splicing rather than a percent load on material costs.

BellSouth's proposal that splicing costs are 212 percent of materials costs implies a splicing rate of 13.4 pairs per hour, which stands in stark contrast to the Commission's proposed figure (in the FDI study) of 250 pairs per hour.[30]

Similarly, with respect to engineering costs, BellSouth's proposal is demonstrably absurd. If one assumes a fully loaded engineering rate of $60 per hour and a 2400 pair 24-gauge cable material cost of $12.77 (from BellSouth's values for Florida), then BellSouth's proposal that engineering cots are 45 percent of materials costs leads to the conclusion that an engineer would require *two workdays* to draw one aerial section of cable between two telephone poles on a schematic.[31]

Sprint's proposed costs for splicing and engineering also cannot withstand scrutiny. Sprint advocates a "per pair foot" charge for aerial and buried splices of $0.003, and a similar charge for underground splices of $0.004. At distances between splices of 1,000 feet for aerial, 2,000 feet for buried, and 400 feet for underground, Sprint's proposed costs result in impossibly low splicing productivity rates of 20.3 pairs per hour for aerial splices, 10.1 pairs per hour for buried splices, and 38.7 pairs per hour for underground splices (versus Staff's recommended 250 pairs per hour).[32] These figures also result in unreasonable costs per splice of $3.00 for aerial, $6.00 for buried, and $1.60 for underground. Similarly, Sprint's proffered rates for engineering result in an improperly low productivity rate of 603 feet per day for aerial cable, 758.7 feet per day for buried cable, and 403.2 feet per day for underground cable.[33]

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[30] Splicing cost = 400 ft. x $12.77 x 212% (from BellSouth at B-8 (% Telco Splicing to Material)) = $10,828.96. Splicing hours = $10,828.96 ÷ $60 per hour = 180.5 hours. Subtract 2 hours for splice setup and closure = 178.5 hours. Splicing rate = 2400 pairs ÷ 178.5 hours = 13.4 pairs per hour.

[31] Engineering costs for aerial cable = $12.77 x 45% (from BellSouth at B-8 (% Telco Engineering to Material)) = $5.75 per foot. Engineering rate per day = $60 per hour x 8 hours per day ÷ $5.75 per foot = 83.5 feet per day. When compared to the Commission's suggested average of 188.8 feet between poles, this 83.5 figure leads to the absurd result that an engineer would require two workdays to draw one aerial section of cable between two adjacent poles on a schematic. In fact, this 83.5 figure should be closer to 10,000. *See* AT&T/MCI at Exhibit A, pp. A6-A8.

C. Cable Fill Factors

As AT&T and MCI WorldCom explained in their comments (at 22-24), the cable sizing factors adopted by the Commission are generally too low. Predictably, the incumbent LECs advance arguments that would push these values even lower.

GTE (at 55-56) and SBC (at 9) argue that unless fill factors are sized down to allow for "ultimate demand," there will be serious service delays and consumers will suffer. GTE at 55. Tellingly, they provide no support for these dire predictions, which are flatly inconsistent with the competitive market standard required by the Commission's forward-looking, economic cost standard.[34] The fill levels used in HAI provides more than enough spare capacity for service work, churn, and unforeseen spikes in demand. Competitive market forces would never allow a carrier to maintain the 10-20 years of idle capacity that is the current practice of incumbent LECs. Indeed, this time period approaches the complete depreciation lives of much of the outside plant used in the incumbent LECs network. In addition, even the incumbent LECs' own economists have recognized that existing capacity levels are above efficient levels because rate-base regulation has given incumbent LECs an incentive to over-invest in spare capacity. According to Professor Alfred Kahn, traditional rate regulation creates a "tendency for public utility companies to . . . maintain a large amount of standby capacity, in excess of peak requirements." *See* 2 Alfred E. Kahn, *the Economics of Regulation* 50-53 (1988 reprint). Finally, sizing currently modeled plant to ultimate demand is inappropriate because today's ratepayers should not have to bear the additional costs of serving tomorrow's customers.[35]

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[32] Aerial: $0.003 pairs per foot x 1,000 feet. x 2400 pairs = $7,200 per splice ÷ $60 per hour = 120 hours, less 2 hours setup = 118 hours; 2400 pairs ÷ 118 hours. = 20.3 pairs per hour. Buried: $0.003 pairs per foot. x 1,000 feet x 2400 pairs = $14,400 per splice ÷ $60 per hour = 240 hours, less 2 hours setup = 238 hours; 2400 pairs ÷ 238 hours = 10.1 pairs per hour. Underground: $0.004 pairs per foot x 400 feet x 2400 pairs = $3,840 per splice ÷ $60 per hour = 64 hours, less 2 hours setup = 62 hours; 2400 pairs ÷ 62 hours = 38.7 pairs per hour.

[33] Aerial: 8 hours per day x $60 per hour = $480 per day ÷ $0.7960 per foot = 603.0 feet per day. Buried: 8 hours per day x $60 per hour = $480 per day ÷ $0.6327 per foot = 758.7 feet per day. Underground: 8 hours per day x $60 per hour = $480 per day ÷ $1.1906 per foot = 403.2 feet per day.

[34] *See* First Report and Order, *In re Implementation of the Local Competition Provisions in the Telecommunications Act of 1996*, 11 FCC Rcd. 15499, ¶ 679 (1996) ("*Local Competition Order*") (Commission's forward-looking, economic cost methodology seeks

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BellSouth, in contrast, simply asks the Commission to adopt the "actual fill factors" estimated by its network engineers. BellSouth at B-12. This should be rejected out of hand. Not only do these embedded fills suffer from the flaws discussed above, they also are supported only by BellSouth's bare assertions – BellSouth does not even explain how its network engineers derived these "estimates" or the nature of the sample studied.

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to replicate competitive market forces).

[35] If it is more efficient for the incumbent LECs to install this plant so far in advance of its use, the future beneficiaries, and not the current ratepayers who receive no benefit, should be more than willing to foot the bill for the incumbent LECs' foresight.

Further, there is a fundamental disconnect between the way BellSouth measures the cable sizing factors that it proposes to the Commission and the way in which the Commission's synthesis model uses them. While BellSouth proposes achieved fill factors, the Commission's model does not take achieved fills as inputs. Rather, the fill factor inputs in the synthesis model are subject to cable size modularity. For example, to "achieve" a 50 percent fill factor would require an input cable fill factor value of approximately 75 percent. Thus, BellSouth is mixing apples and oranges.

Finally, the Commission should reject GTE's claim that the synthesis model's method of calculating density zones understates costs. GTE at 55. While GTE is correct that the synthesis model's methodology calculates density in a way that applies input values associated with a higher density zone than is warranted, GTE is simply wrong that this decreases costs. Rather, as AT&T and MCI WorldCom have explained, because many of the input values increase in cost as density increases, the overall result of this error is that the synthesis model overestimates costs. *See* AT&T March 30, 2999 *ex parte* at 6 & Fig. 7 (showing that changing the density definition within the HAI Model to determine density at the cluster level inflated BellSouth-Alabama's monthly USF cost by 7 percent and its monthly loop cost by 8 percent).[36]

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[36] GTE asserts that the Commission's proposed treatment of fill factors is flawed because within any density zone there may be some distribution areas that should have higher fills and others that should have lower fills. GTE at 54. Although the factual predicate of this argument is true, GTE's argument is a *non sequitor*. The Commission's use of "generalized" fill factors reflects average fill levels that exist in a particular density zone. Since these fill factors are far from a 95 percent-plus range, there is significant room for variability within a particular distribution area. It also is unclear what basis GTE would propose to use for calculating distribution area-specific fill factors within a density zone. On the other hand, AT&T and MCI WorldCom agree with GTE that "[t]he resulting fill factors should be reported by the Model as a means of validating the reasonableness of its

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D. Structure Costs

1. Aerial, Underground, And Buried Structure.

A few incumbent LECs have challenged the Commission's proposed input values for structure costs. *See, e.g.,* Sprint at 30-33; SBC at 10-11; Cincinnati Bell at 4-5; GTE at 50-53. As with copper cable costs, the incumbent LECs' principal attack is based on the alleged inadequacies of the NRRI study, which the Commission used as a "starting point" for the development of structure costs. *See, e.g.*, Sprint at 30-33; SBC at 10-11; Cincinnati Bell at 4-5; GTE at 50-53; *see also Further Notice*, ¶ 107. The incumbents also challenge the Commission's proposed loading factor for engineering. *See, e.g.*, Sprint at 31; SBC at 10.

The incumbent LECs utterly fail to show that Commission's proposed values are unreasonable. Indeed, BellSouth concedes that the Commission's proposed values for aerial structure are "fairly representative of BellSouth's values." BellSouth at B-12. Similarly, Cincinnati Bell concedes that the Commission's proposed values for underground structure never vary from Cincinnati Bell's "actual" costs by more than 15 percent. Cincinnati Bell at 4. And, although Sprint challenges the 10% engineering loading factor for aerial structure, SBC concedes that "a loading factor of 10% is appropriate for the material and labor costs for poles, anchors, and other pole-related items." SBC at 10. These concessions, standing alone, show that the Commission's proposed values are more than reasonable.

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results." *Id.* AT&T and MCI WorldCom have done precisely that in more recent versions of the HAI model.

In addition, as explained above, the relevant question before the Commission is not whether the NRRI study falls short of perfection, but whether the incumbent LECs have provided the Commission with more credible evidence. They have not. Their much-touted "actual cost" values are unsupported and unverified, and the Commission has properly refused to base its decisions on such unvalidated and self-serving proposals. Further, the Commission did not blindly adopt the NRRI values, but instead recognized that the values for aerial structure were consistent with data submitted in response to the 1997 Data Request, *Further Notice,* ¶ 107, and modified all of the structure values to reflect engineering costs.

The Commission also reasonably determined that it would extrapolate underground and buried structure costs for zones 3 through 9 based on the costs for zones 1 and 2. The Commission based this extrapolation "on the growth rate between density zones in the BCPM and HAI default values for underground and buried structure," and thus used a rational methodology to estimate structure costs for the higher density zones. *See Further Notice*, ¶ 112. Although the incumbent LECs claim, without specification, that this approach is "problematic," GTE at 53, the Commission reasonably concluded that the extrapolated data are "the best data currently available for this purpose." *Further Notice,* ¶ 112.

2. Distribution Plant Mix.

Some incumbent LECs complain that the default values for distribution plant mix tentatively adopted by the Commission are improperly based on nationwide values, and instead should be based on company-specific values.[37] As discussed above, the

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[37] By contrast, SBC supports the use of nationwide plant mix values. SBC at 11.

Commission should, for many reasons, reject the incumbents' requests for company-specific values.

AT&T and MCI WorldCom (at 25-27) also have shown that the Commission's proposed values for underground distribution call for too much underground cable and too little aerial cable. The only company to provide separate plant mix values for distribution and feeder plant – BellSouth – submitted data showing that its *maximum* percentage of underground distribution plant investment in any of its 9 states was a mere 2 percent – a figure that is dramatically less than the results implied by the current synthesis model assumptions. *Id.* BellSouth also has proposed to the Commission figures for the share of underground distribution plant that inexplicably are *over 8 times greater* than those it filed in BellSouth's 1997 USF Data Request for Florida.[38] Given BellSouth's concessions regarding the low amount of underground distribution plant in its network, and the general credibility problems with the incumbent LECs' self-reported data, the Commission should not have relied on those data to support its proposed underground distribution percentages that range as high as 90 percent. *See Further Notice*, ¶ 199. It is critical that the Commission redress this problem and adopt underground distribution percentages more in line with actual and competitive realities.[39]

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[38] When BellSouth's currently advocated values for Florida are inserted into the Commission's model, 17 percent of the distribution cable investment is classified as underground. By contrast, BellSouth in its 1997 Florida USF data request response reports an actual underground investment of 2 percent for Florida. Similarly, although BellSouth advocates underground feeder inputs that result in 59 percent underground feeder investment in the Commission's model, it reports only 31 percent actual underground feeder investment in its 1997 Florida USF data request response.

[39] Although underground cable may be more common in high density areas, the only data available combines both feeder and distribution cable. *See* AT&T/MCI WorldCom at 26. These data should not be misconstrued to indicate uniform application of underground

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E. Structure Sharing

Several incumbent LECs complain that the structure sharing percentages for aerial, buried, and underground cable tentatively adopted by the Commission assign too little structure cost to the LEC.[40] Specifically, the incumbent LECs claim that the HAI sponsors have improperly assumed a "scorched everybody" rather than a "scorched incumbent LEC" approach, that competition will not increase incentives for sharing, that opportunities for sharing are rare, and that the Commission's tentatively adopted values are "unsupported and unachievable." *See, e.g.,* Ameritech at 22-24; Sprint at 36. All of these arguments are squarely refuted by the comments of another incumbent LEC – SBC – who concedes that "*the sharing assignments proposed by the Commission . . . align with current embedded sharing costs.*" SBC at 11 (emphasis added).

The incumbent LECs' arguments also are refuted by the very evidence on which they purport to rely. For example, Mr. Kirk Kaalberg, Network Service President of McLeod USA – quoted by both Ameritech (at 23) and U S West at 29 – testified in a recent proceeding in Iowa that McLeod currently bears only 60 to 75 percent of its buried placement costs. These percentages are consistent with the Commission's proposed percentages for buried structure sharing, which range from 55 to 90 percent. *See Further Notice*, at A-7. The incumbent LECs' arguments are further refuted by BellSouth's 1997

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structure. Ninety percent of underground feeder combined with 2 percent distribution will still yield a high overall average percentage of underground structure because distribution cable is extremely short in the highest density zone, frequently requiring either no distribution cable, or only some riser cable that will be substantially less than, *e.g.*, 1,454 feet (the height of the Sears Tower in Chicago).

[40] *See, e.g.*, Ameritech at 22-24; U S West at 28-32; Sprint at 36.

filing which shows sharing percentages of 65 and 72 percent for buried structure in Kentucky and Georgia.[41] These figures stand in stark and telling contrast to BellSouth's currently proposed values of 90 percent and 90 percent for the same states.[42]

In addition, the incumbent LECs appear to have improperly narrowed the definition of underground structure sharing by assuming that such sharing requires simultaneous placement of individually owned ducts in a trench, and by failing to consider the sharing made available when an individual owner places and leases multiple ducts. *See, e.g.*, BellSouth at B-13; Sprint at 36. Efficient carriers, seeking to take advantage of the revenue sharing opportunities created by increased competition and changes in the regulatory environment, will deploy underground structure with spare duct capacity that can be leased to other carriers or utilities.[43] Simultaneous placement therefore is not necessary for structure sharing to occur. The incumbent LECs' artificial narrowing of the scope of underground sharing may explain why their reported extent of underground sharing is so low.

Sprint also erroneously argues that "leasing duct space is not at all the same as sharing the costs of a common trench" and that such leasing should not be counted as structure sharing because the "cost for additional duct capacity beyond the needs of the telephone network is not modeled in the Synthesis Model." Sprint at 36-37. It is irrelevant, in terms of the incumbent LECs' costs, whether one party digs the trench and two parties put in duct, or one party digs the trench and puts in the ducts and then leases duct capacity to another party. Furthermore, the cost of additional ducts is negligible compared to total trenching costs. Accordingly, it would be perverse to significantly skew the model's results by failing to properly account for structure sharing (including leasing) merely because the model does not account for insignificant additional duct costs.

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[41] BellSouth 1997 USF Data Request, response 8c.

[42] BellSouth at Exhibit 1.

[43] The costs of spare ducts is insignificant when compared to the costs of trenching.

In fact, as AT&T and MCI WorldCom have shown, the proposed forward-looking structure sharing factors, in fact, assign far too great a share of structure costs to the LEC. This showing is confirmed by SBC, who has conceded that the sharing percentages proposed by the Commission "align with current *embedded* sharing costs." SBC at 11 (emphasis added). Modeled structure sharing percentages should not be based on the incumbent LECs' embedded sharing practices, but instead should be based on forward-looking principles. AT&T/MCI WorldCom at 28-32. And even the incumbent LECs have recognized that "there are strong business incentives to [share structure]," that local municipalities are adopting franchise requirements that direct LECs to share structure with other companies, and that opportunities for sharing will be especially prevalent in new housing developments. *See, e.g.,* Ameritech at 24-25. The Commission's proposed sharing percentages are too high to reflect forward-looking realities, and they should be reduced so that they are more in line with the forward-looking HAI values.

F. Digital Loop Carrier Costs

The incumbent LECs' silence with respect to digital loop carrier ("DLC") costs likely reflects their pleasure with the inflated values tentatively proposed by the Commission. As shown in AT&T's and MCI WorldCom's comments (at 32-35), the proposed DLC costs are inflated because they are derived from incumbent LEC data allegedly "based on actual costs incurred in purchasing DLCs," *Further Notice,* ¶ 144, but which in fact are totally unsupported by any such verifiable evidence and, indeed, are flatly refuted by the very contract information proffered by the incumbent LECs. Accordingly, the Commission should adopt the forward-looking DLC cost values proposed by the HAI sponsors.

G. Serving Area Interface Costs

AT&T and MCI WorldCom support the indoor serving area interface ("SAI") costs tentatively adopted by the Commission, and urge the Commission to reject the incumbent LECs' efforts to further inflate these costs. The Commission's Staff presented a logical input-by-input methodology for developing indoor SAI costs, and proposed an input value of $21,708 for a 7200 pair indoor SAI. Although the HAI sponsors believe that this SAI is still over-engineered, and that certain of its components are overpriced, they are willing to accept the Staff's analysis.

In no event should the Commission accept the inputs values proposed by BellSouth, which in some cases (*e.g.*, in South Carolina) exceed the Staff's recommendation by a factor of 5 or more.[44] Although BellSouth claims these costs are "actual," "least-cost," and "efficient," they are so inflated they defy reason. And, as usual, BellSouth provides no explanation for its proposed values.

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[44] BellSouth (at Exhibit 1) has submitted the following SAI costs:

North Carolina	$ 96,517.88
Alabama	$119,820.15
Mississippi	$124,260.02
Georgia	$128,164.86
Kentucky	$133,644.29
Tennessee	$137,070.41
Florida	$147,067.15
Louisiana	$147,674.94
South Carolina	$170,317.80

The Commission should likewise reject GTE's argument that "the Model does not reflect the fact that the maximum SAI line capacity is one-half the number of pairs, adjusted for fill rates," which allegedly "results in a significant underestimate of SAI investment and a network that does not function." GTE at 6. As the Commission's Staff shows in its calculation of a 7200 pair FDI, 3100 feeder pair terminations and 4100 distribution pair terminations are appropriate under generally accepted outside plant engineering guidelines that size FDIs at a larger size than allocations of cable pairs. These generally accepted guidelines call for 1.5 feeder pairs per living unit plus business lines, and 2.0 distribution pairs per living unit plus business lines. Thus, GTE's requested 50:50 breakdown of feeder to distribution is not normally used because the cable sizing factors for distribution plant are usually lower than they are for feeder plant. Accordingly, the Commission has advocated the proper 1.5:2.0 ratio.[45]

The Commission should reject Sprint's suggestion (at 40) that "the sole tangible support for a splicing rate of 300 pairs per hours is a letter from a manufacturer that sells splicing equipment to a potential large customer." On January 20, 1999, the HAI sponsors provided an extensive demonstration – attended by several incumbent LECs – of splicing methods that fully supported the HAI sponsors' proposed (and the Commission's adopted) splicing rate. *See Further Notice*, ¶ 138 n.250.

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[45] Furthermore, GTE erroneously claims that "[i]f the 7,200 [SAI] line size reflects the maximum size SAI to be considered, then the line limit should be 2,800 lines." GTE at 46. In fact, AT&T and MCI WorldCom have taken a more conservative stance, proposing instead that the SAI should be sized based on 1.5 pairs per living unit plus business lines, for feeder, plus 2.0 pairs per living unit plus business lines for distribution. The Commission's Staff agreed with this method, as evidenced by their calculation for the indoor SAI (3100 feeder pairs + 4100 distribution pairs = 7200 line SAI).

The Commission also should reject Sprint's claim that "[o]n page 9 of their February 8th, 1999 *ex parte*, AT&T/MCI (the HAI Sponsors) state that the NRRI RUS data demonstrates that the average cost to do modular splicing (the type of splicing in question) was $95.37 per 100 pair," and that this cost is "clearly inconsistent with the 300 pairs per hour that AT&T/MCI used in their splice cost calculations for SAIs and in their February 8th, 1999, *ex parte* calculations." As AT&T and MCI WorldCom made clear in their February 8, 1999 *ex parte* submission, the overall average of $95.37 is *inappropriate* "because the NRRI analysis is based on RUS data that rarely include cable observations in excess of 400 pairs."[46]

Similarly, Sprint's allegation (at 40) that "[t]he cross-connect method proposed by AT&T is not an SAI, but a simple building entrance terminal" is patently false. The design embraced by AT&T, MCI WorldCom, the Commission, and other parties squarely meets the SAI definition of providing an interface between feeder and distribution facilities.

Finally, the allegation that SAIs should be sized to fit the actual cable sizes they serve, rather than the fill factor-inflated pair count required by the cluster, merely represents an effort to over-inflate costs by adding wasteful network capacity that the model has deemed superfluous, and the Commission therefore should reject it.

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[46] In addition, Sprint's claim is incorrect because the $95.37 average cost includes more than just splicing – it includes the setup and closure costs accounted for separately by the Staff and by AT&T/MCI WorldCom.